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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,615	06/27/2003	Kenneth E. Goodson	S243 1020.4	7991

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EXAMINER

MCKINNON, TERRELL L

ART UNIT PAPER NUMBER

3743

DATE MAILED: 12/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/607,615

Applicant(s)

GOODSON ET AL.

Examiner

Terrell L Mckinnon

Art Unit

3743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 04 October 2004.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,115-153,155-209 and 211-228 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 209-228 is/are allowed.
- 6) ☒ Claim(s) 1,115-138,140-164,166-168,172,173,184-189,191,193,194,198 and 199 is/are rejected.
- 7) ☒ Claim(s) 139,165,169-171,174-183,190,192,195-197 and 200-208 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

***Response to Amendment***

Receipt is acknowledged of applicant's amendment filed October 4, 2004. Claims 1 and 115-153,155-209 and 211-228 are pending and an action on the merits is as follows.

Applicant's arguments with respect to claims 1 and 115-153,155-209 and 211-228 have been considered but are moot in view of the new grounds of rejection.

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 115, 116, 118, 125, 128, 131, 164, 167, 173, 184, 189 and 191 are rejected under 35 U.S.C. 102(b) as being anticipated by Chu et al. (U.S. 5,269,372).

Chu discloses and intersecting flow network for a cooling system comprising all of the applicant's claimed and disclosed limitations of the instant invention ( see abstract; column 1, lines 8-12, column 1, lines 47-60, column 2, lines 30-35).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 3743

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 117, 120-124, 126, 127, 130, 132-138, 166, 172 and 185-188 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (U.S. 5,269,372) in view of Arana (U.S. 2003/0027022).

Chu's ('372) invention discloses all of the claimed limitations from above except for the use of an electroosmotic pump; the multi-layered substrate being fabricated from a plurality of materials bonded together; a silver-filled epoxy or solder thermal interface material; a plurality of integrated circuits and the substrate is disposed between the integrated circuits; the heat device being made from silicon and the substrate from metal; the micro-layers are made from metal and/or silicon and glass; and the use of temperature sensors, flow sensors and feedback controls within the micro-channel.

5. However, Arana teaches the use of a thermally efficient micro-channel device comprising using the device has a heat exchanger for transferring heat in conjunction with an electroosmotic pump (see [0003]; [0033]; [0055]); the multi-layered substrate being fabricated from a plurality of materials bonded together (see [0044]; [0059]; [0075-0076]; [0081]; and the use of temperature sensors, flow sensors and feedback controls within the micro-channel (see [0037]; (page 4, column 2, lines3-6); and [0059]

Given the teachings of Arana, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cooling system of Chu with use of an electroosmotic pump; the multi-layered substrate being fabricated from a plurality of materials bonded together; a silver-filled epoxy or solder thermal interface material; a

Art Unit: 3743

plurality of integrated circuits and the substrate is disposed between the integrated circuits; the heat device being made from silicon and the substrate from metal; the micro-layers are made from metal and/or silicon and glass; and the use of temperature sensors, flow sensors and feedback controls within the micro-channel.

Doing so would provide an improved and more efficient micro-channel cooling device.

6. Claims 129 and 168 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chu et al. (U.S. 5,269,372) in view of Arana (U.S. 2003/0027022) as applied to claims above, and further in view of the China Reference (97212126.9).

Chu's invention, as modified by Arana, discloses all of the claimed limitations from above except for a high flow rate electroosmotic pump; wherein the pump is disposed between the heat exchanger and the substrate.

7. However, China Reference teaches the use of a high flow rate electroosmotic pump.

Given the teachings of the China Reference, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the cooling system of Chu with a high flow rate electroosmotic pump; wherein the pump is disposed between the heat exchanger and the substrate.

Doing so would provide a pump that is capable of dispensing fluid at high rates for improve heat transfer.

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 3743

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1, 140-143, 147-148, 150, 156, 193, 194, 198 and 199 are rejected under 35 U.S.C. 103(a) as being unpatentable Hamilton et al. (U.S. 5,901,037) in view of China Reference (97212126.9).

Hamilton discloses all of the applicant's claimed limitations except for a high flow rate electroosmotic pump.

10. However, China Reference teaches the use of a high flow rate electroosmotic pump.

Given the teachings of the China Reference, it would have been obvious to one of ordinary skill in the art at the time of the invention to further modify the cooling system of Chu with a high flow rate electroosmotic pump; wherein the pump is disposed between the heat exchanger and the substrate.

Doing so would provide a pump that is capable of dispensing fluid at high rates for improve heat transfer.

11. Claims 144-146, 149, 151-153, 155 and 157-163 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamilton et al. (U.S. 5,901,037) in view of China Reference (97212126.9) as applied to claims above, and further in view of the Arana (U.S. 2003/0027022).

Chu's invention, as modified by Arana, discloses all of the claimed limitations from above except for the use of an electroosmotic pump; the multi-layered substrate being fabricated from a plurality of materials bonded together; a silver-filled epoxy or

Art Unit: 3743

solder thermal interface material; a plurality of integrated circuits and the substrate is disposed between the integrated circuits; the heat device being made from silicon and the substrate from metal; the micro-layers are made from metal and/or silicon and glass; and the use of temperature sensors, flow sensors and feedback controls within the micro-channel.

12. However, Arana teaches the use of a thermally efficient micro-channel device comprising using the device has a heat exchanger for transferring heat in conjunction with an electroosmotic pump (see [0003]; [0033]; [0055]); the multi-layered substrate being fabricated from a plurality of materials bonded together (see [0044]; [0059]; [0075-0076]; [0081]; and the use of temperature sensors, flow sensors and feedback controls within the micro-channel (see [0037]; (page 4, column 2, lines3-6); and [0059]

Given the teachings of Arana, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the cooling system of Chu with use of an electroosmotic pump; the multi-layered substrate being fabricated from a plurality of materials bonded together; a silver-filled epoxy or solder thermal interface material; a plurality of integrated circuits and the substrate is disposed between the integrated circuits; the heat device being made from silicon and the substrate from metal; the micro-layers are made from metal and/or silicon and glass; and the use of temperature sensors, flow sensors and feedback controls within the micro-channel.

Doing so would provide an improved and more efficient micro-channel cooling

***Allowable Subject Matter***

13. Claims 209-228 is allowed.

Art Unit: 3743

14. Claims 139,165,169-171,174-183,190,192,195-197 and 200-208 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Response to Arguments***

Applicant's arguments filed October 4, 2004 have been fully considered but they are found not persuasive in view of the newly discovered references to Chu et al. (U.S. 6,253,835) and Hamilton et al. (U.S. 5,901,037).

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.




Art Unit: 3743

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Terrell L Mckinnon whose telephone number is 571-272-4797. The examiner can normally be reached on Monday -Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Bennett can be reached on 571-272-4791. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Terrell L Mckinnon  
Primary Examiner  
Art Unit 3743  
December 13, 2004